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EXAMINER	
DODDS, HAROLD E	

ART UNIT	PAPER NUMBER
2167	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/029,883	CHARIKAR, MOSES SAMSON	
	Examiner	Art Unit	
	Harold E. Dodds, Jr.	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/2/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-25, 27, and 29 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The use of a computer is critical or essential to the practice of the invention, but is not included in the claim(s) and is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The Specification provides adequate support for the implementation of the proposed invention on a computer on pages 5 and 6, but none the preambles or any of the limitations included in independent claims 1, 14, 21, 27, and 29 provide any language indicating that a step was performed using a computer.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-25, 27, and 29 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. The language of the claims raise a question as to whether the claim is directed merely to an abstracted idea that is not tied to a technological art, environment, or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. Modification of the preambles of the

independent claims with language stating implementation of these methods on a computer would overcome this rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-5, 7-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri et al. (U.S. Patent No. 5,806,061), Dasgupta (U.S. Patent No. 5,612,865), Kisor et al. (U.S. Patent No. 5,067,152), and Kaufman et al. (U.S. Patent No. 5,101,475).

7. Chaudhuri renders obvious independent claim 1by the following:

"...identifying a set of features corresponding to the first object..." at col. 4, lines 39-41 and col. 1, lines 60-62.

"...generating for each feature..." at col. 20, lines 15-17 and col. 9, lines 14-17.

Chaudhuri does not teach the use of hashing vectors, the summing of vectors, and the use of n-bit representations.

8. However, Dasgupta teaches the use of hashing vectors as follows:

"...a hashing vector having n coordinates..." at col. 10, lines 50-53.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dasgupta with Chaudhuri to use hashing vectors in order to organize the vectors into groups related to properties to these groups. Chaudhuri and Dasgupta

teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations. Chaudhuri provides sets of features corresponding to objects and Dasgupta provides the hashing vectors.

Dasgupta does not teach the summing of vectors and the use of n-bit representations.

9. However Kisor teaches the summing of vectors as follows:

"...summing the hashing vectors to obtain a summed vector..." at col. 9, lines 49-51.

"...of the summed vector..." at col. 9, lines 49-51.

"...of the summed vector..." at col. 9, lines 49-51.

It would have been obvious to one of ordinary skill at the time of the invention to combine Kisor with Chaudhuri and Dasgupta to sum vectors in order to use a standard mathematical method of establishing relationships between vectors. Chaudhuri, Dasgupta, and Kisor teach the use of related applications. They teach the use of computers, the use of hashing, the use of vectors, and the use of representations and Chaudhuri and Kisor teach the use of attributes and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, and Kisor teaches the summing of vectors.

Kisor does not teach the use of n-bit representations.

10. However Kaufman teaches the use of n-bit representations as follows:

"...and creating an $n^{*x\text{-bit}}$ representation..." at col. 3, lines 42-44 and col. 24, lines 21-27.

"...by calculating an x-bit value for each coordinate..." at col. 27, lines 17-22, col. 24, lines 21-27, and col. 25, lines 29-34.

It would have been obvious to one of ordinary skill at the time of the invention to combine Kaufman with Chaudhuri, Dasgupta, and Kisor to use multi-bit representations in order to use standardized computer structures defined in bits to represent vectors. Chaudhuri, Dasgupta, Kisor, and Kaufman teach the use of related applications. They teach the use of computers, the use of vectors, and the use of representations, Chaudhuri, Dasgupta, and Kaufman teach the use of databases and the use of objects, and Chaudhuri, Kisor, and Kaufman teach the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Kisor provides the summing of vectors, and Kaufman provides n-bit representations of vectors.

11. As per claim 2, the "...set of features is a vector...," is taught by Chaudhuri at col. 1, lines 60-62 and col. 8, lines 51-53.

12. As per claim 3, the "...generating for each feature...," is taught by Chaudhuri at col. 20, lines 15-17 and col. 9, lines 14-17,

the "...hashing vector comprises...," is taught by Dasgupta at col. 10, lines 50-53,

the "...determining a weight associated with each feature...," is taught by Chaudhuri at col. 20, lines 48-50 and col. 9, lines 14-17,

the "...generating for each feature...," is taught by Chaudhuri at col. 20, lines 15-17 and col. 9, lines 14-17,

the "...hashing vector having n coordinates...," is taught by Dasgupta at col. 10, lines 50-53,

the "...and multiplying each hashing vector...," is taught by Kaufman at col. 4, lines 47-51,

the "...by the weight determined for the corresponding feature...," is taught by Chaudhuri at col. 20, lines 48-50 and col. 9, lines 14-17.

13. As per claim 4, the "...object is a document...," is taught by Chaudhuri at col. 1, lines 60-62 and col. 2, lines 59-61.

14. As per claim 5, the "...each feature is a word within the document...," is taught by Chaudhuri at col. 9, lines 14-17, col. 7, lines 60-64, and col. 2, lines 59-61.

15. As per claim 7, the "...x is equal to 1...," is taught by Kaufman at col. 24, lines 21-27.

16. As per claim 8, the "...n is equal to 64...," is taught by Kaufman at col. 24, lines 21-27.

17. As per claim 9, the "...repeating acts (a) - (d) for a second object to create a second $n^{*x\text{-bit}}$ representation...," is taught by Kaufman at col. 1, lines 44-47, col. 6, lines 29-32, and col. 24, lines 21-27,

the "...and comparing the first and second n*x-bit representations...," is taught by Kaufman at col. 4, lines 51-57 and col. 24, lines 21-27,

and the "...to determine whether the first and second objects are similar...," is taught by Kaufman at col. 6, lines 29-32 and col. 21, lines 46-52.

18. As per claim 10, the "...discarding either one of the first or second objects...," is taught by Kaufman at col. 6, lines 16-19 and col. 6, lines 29-32.

19. As per claim 11, the "...repeating acts (a) - (d) for m objects to create m n*x-bit representations...," is taught by Kaufman at col. 17, lines 44-47, col. 6, lines 29-32, and col. 24, lines 21-27,

the "...and grouping the m objects...," is taught by Kaufman at col. 17, lines 21-26 and col. 6, lines 29-32,

and the "...based on their corresponding n*x-bit representations...,"is taught by Kaufman at col. 24, lines 21-27.

20. As per claim 13, the "...comprises generating for each feature...," is taught by Chaudhuri at col. 20, lines 15-17 and col. 9, lines 14-17,

the "...hashing vector having n coordinates...," is taught by Dasgupta at col. 10, lines 50-53,

the "...such that the hashing vectors...," is taught by Dasgupta at col. 10, lines 50-53,

and the "...are similar for similar features...;" is taught by Chaudhuri at col. 23, lines 37-38 and col. 1, lines 60-62.

21. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, Kisor, and Kaufman as applied to claim 1 above, and further in view of Broder et al. (U.S. Patent No. 6,349,296).

As per claim 6, the "...object is a summary of another object...," is not taught by either Chaudhuri, Dasgupta, Kisor, or Kaufman.

However, Broder teaches the use of summaries of objects as follows:

"...The elements so selected constitute a sketch of the data object. The sketches characterize the resemblance of the data objects..." at col. 2, lines 45-47.

It would have been obvious to one of ordinary skill at the time of the invention to combine Broder with Chaudhuri, Dasgupta, Kisor, and Kaufman to use summaries of documents in order to use a reduced representation of a document to facilitate comparison with other reduced representations. Chaudhuri, Dasgupta, Kisor, Kaufman, and Broder teach the use of related applications. They teach the use of computers, the use of vectors, and the use of representations, Chaudhuri, Dasgupta, Kisor, and Broder teach the use of hashing, Chaudhuri, Dasgupta, Kaufman, and Broder teach the use of objects, and Chaudhuri, Kisor, Kaufman, and Broder teach the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Kisor provides the summing of vectors, Kaufman provides n-bit representations of vectors, and Broder provides summaries of objects.

22. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, Kisor, and Kaufman as applied to claim 11 above, and further in view of Deering (U.S. Patent No. 6,603,470).

As per claim 12, the "...compressing the objects by group...," is not taught by either Chaudhuri, Dasgupta, Kisor, or Kaufman.

However, Deering teaches the compression of groups of objects as follows:

"...At step 200, an object is represented by an explicit group of triangles to be compressed, along with quantization thresholds for positions, normals, and colors..." at col. 14, lines 44-46.

It would have been obvious to one of ordinary skill at the time of the invention to combine Deering with Chaudhuri, Dasgupta, Kisor, and Kaufman to compress groups of objects in order to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, Kisor, Kaufman, and Deering teach the use of related applications. They teach the use of computers, the use of vectors, and the use of representations, Chaudhuri, Dasgupta, Kaufman, and Deering teach the use of objects, and Chaudhuri, Kisor, Kaufman, and Deering teach the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Kisor provides the summing of vectors, Kaufman provides n-bit representations of vectors, and Deering provides compression of groups of objects.

23. Claims 14-16, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri et al. (U.S. Patent No. 5,806,061), Dasgupta (U.S. Patent No. 5,612,865), and Caid et al. (U.S. Patent No. 5,794,178).

24. Chaudhuri renders obvious independent claims 14, 27, and 28, by the following:

"...generating a vector corresponding to the object..." at col. 20, lines 15-17, col. 8, lines 51-53, and col. 1, lines 60-62.

the "...being associated with a corresponding weight..." at col. 20, lines 48-50.

"...to generate a product vector..." at col. 20, lines 15-17.

Chaudhuri does not teach the use of hashing vectors with associated coordinates, the use of compact representations, and the use of summed product vectors.

25. However, Dasgupta teaches the use of hashing vectors with associated coordinates as follows:

"...each coordinate of the vector..." at col. 10, lines 50-53.

"...associated with each coordinate in the vector by a corresponding hashing vector..." at col. 10, lines 50-53.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dasgupta with Chaudhuri to use hashing vectors in order to organize the vectors into groups related to properties to these groups. Chaudhuri and Dasgupta teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations. Chaudhuri provides sets of features corresponding to objects and Dasgupta provides the hashing vectors.

Dasgupta does not teach the use of compact representations and the use of summed product vectors.

26. However, Caid teaches the use of compact representations and the use of summed product vectors as follows:

"...multiplying the weight..." at col. 20, lines 17-30.

"...summing the product vectors to obtain a summed product vector..." at col. 36, lines 27-31 and col. 12, lines 26-28.

"...and generating a compact representation of the object..." at col. 14, line 23 and col. 14, lines 40-43.

"...using the summed product vectors..." at col. 12, lines 26-28.

It would have been obvious to one of ordinary skill at the time of the invention to combine Caid with Chaudhuri and Dasgupta to use summed product vectors and compact representations in order to determine the characteristics that are most representative of the objects and to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, and Caid teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations, Chaudhuri and Caid teach the use of attributes, the use of documents, the use of words, the use of values, and the use of features, and Dasgupta and Caid teach the use of networks and the use of coordinates. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, and Caid provides summed product vectors and compact representations.

27. As per claim 15, the "...weights are real numbers...," is taught by Caid at col. 20, lines 16-19.

28. As per claim 16, the "...weights include values between zero and one...," is taught by Caid at col. 20, lines 16-19, col. 17, lines 63-67, and col. 18, lines 1-3.

29. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, and Caid as applied to claim 14 above, and further in view of Broder.

As per claim 17, the "...object...," is taught by Chaudhuri at col. 1, lines 60-62, but ths "is a web document...," is not taught by either Chaudhuri, Dasgupta, or Caid.

However, Broder teaches the use of web documents as follows:

"...It should be kept in mind that when the input data records are Web documents, the combined size of the input data can be on the order of 300 Gbytes..." at col. 5, 59-61.

It would have been obvious to one of ordinary skill at the time of the invention to combine Broder with Chaudhuri, Dasgupta, and Caid to use web documents in order to have a source of documents outside to the immediate computer system and gain greater acceptance from potential users. Chaudhuri, Dasgupta, Caid, and Broder teach the use of related applications. They teach the use of computers, the use of hashing, the use of vectors, the use of objects, and the use of representations and Chaudhuri, Caid, and Broder teach the use of documents, the use of words, and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and Broder provides web documents.

30. As per claim 18, the "...coordinates in the vector...," is taught by Dasgupta at col. 10, lines 50-53

and the "...correspond to words in the web document...," is taught by Broder at col. 5, lines 64-65 and col. 5, lines 59-61.

31. As per claim 19, the "...assigning the weights...," is taught by Caid at col. 20, lines 16-19,

the "...for each coordinate of the vector...," is taught by Dasgupta at col. 10, lines 50-53,

the "...as the number of occurrences of the word within the web document...," is taught by Broder at col. 9, lines 33-36, col. 5, lines 64-65, and col. 5, lines 59-61,

the "...divided by the number of web documents...," is taught by Broder at col. 7, lines 36-40, col. 7, lines 46-49, and col. 5, lines 59-61,

and the "...contained in a collection of web documents that contain the word...," is taught by Broder at col. 9, lines 50-51, col. 5, lines 59-61, and col 5, lines 64-65.

32. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, and Caid as applied to claim 14 above, and further in view of London (U.S. Patent No. 6,061,734).

As per claim 20, the "...values in the hashing vectors...," is taught by Caid at col. 5, lines 13-16, col. 36, lines 66-67, and col. 37, line 1,

the "...based on the coordinate corresponding to the hashing vector...," is taught by Dasgupta at col. 10, lines 50-53,

but the "...are generated using a pseudo random number generator seeded...," is not taught by either Chaudhuri, Dasgupta, or Caid.

However, London teaches the use of pseudo random number generators as follows:

"...In another embodiment of the present invention, a single hash function H is carried out on the identifier of the authorized user, the result being used as a seed for a pseudo-random number generator, which is then iterated n times to generate the n query integers k_1, k_2, ...k_n..." at col. 5, lines 32-36.

It would have been obvious to one of ordinary skill at the time of the invention to combine London with Chaudhuri, Dasgupta, and Caid to use pseudo random number generators in order to generate query integers to be used in queries of the system. Chaudhuri, Dasgupta, Caid, and London teach the use of related applications. They

teach the use of computers, the use of hashing, the use of vectors, and the use of representations and Chaudhuri, Caid, and London teach the use of words and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and London provides pseudo random number generators.

33. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri, Dasgupta, and Caid as applied to claim 14 above, and further in view of Deering.

As per claim 21, the "...of the value of the coordinate...," is taught by Caid at col. 30, lines 25-27 and col. 31, lines 35-36,

but the "...each bit is generated based on the sign...," is not taught by either Chaudhuri, Dasgupta, or Caid.

However, Deering teaches the use of signs as follows:

"...More particularly, as shown by FIG. 3, the unit sphere is symmetrical by sign bits in the eight quadrants by sign bits. By allowing three of the normal representation bits to be the three sign bits of the xyz components of a normal, it then is only necessary to represent one eighth of the unit sphere..." at col. 10, lines 37-41.

It would have been obvious to one of ordinary skill at the time of the invention to combine Deering with Chaudhuri, Dasgupta, and Caid to use signs of numbers in order to specify whether a number is positive or negative. Chaudhuri, Dasgupta, Caid, and Deering teach the use of related applications. They teach the use of computers, the use of vectors, the use of objects, and the use of representations and Chaudhuri, Caid, and Broder teach the use of words and the use of values. Chaudhuri provides sets of

features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and Deering provides bits representing signed numbers.

34. Claims 22, 23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broder et al. (U.S. Patent No. 6,349,396) and Hatakeyama et al. (U.S. Patent No. 5,469,354).

35. Broder renders obvious independent claim 22 by the following:

"...creating a similarity sketch for each of first and second objects..." at col. 2, lines 45-47 and col. 4, lines 52-56.

"...to a vector representation of the first and second objects..." at col. 2, lines 53-55.

"...the similarity sketches for the first and second objects..." at col. 2, lines 45-47 and col. 4, lines 52-56.

"...and generating a value defining the similarity between the first and second objects..." at col. 7, lines 35-37 and col. 4, lines 52-56.

Broder does not teach the use of hashing functions or bitwise comparisions.

However, Hatakeyama teaches the use of hashing functions or bitwise comparisions as follows:

"...based on an application of a hashing function..." at col. 21, lines 39-42.

"...comparing, on a bit-by-bit basis..." at col. 15, lines 58-65.

"...based on a correspondence in the bit-by-bit comparison..." at col. 15, lines 58-65.

It would have been obvious to one of ordinary skill at the time of the invention to combine Hatakeyama with Broder to use hashing functions in order to reduce the size

of the representation of objects for classification into hash buckets. Likewise, it would have been obvious to one of ordinary skill at the time of the invention to combine Hatakeyama with Broder to use bitwise comparison in order to determine the similarity between the representations of objects. Broder and Hatakeyama teach the use of related applications. They teach the use of computers, the use of documents, the use of words, the use of representations, the use of hashing, the use of values, and the measurement of similarity. Broder provides sketches, vectors, and objects and Hatakeyama provides hashing functions and bitwise comparisons.

36. As per claim 23, the "...determining that the first and second objects are similar...," is taught by Broder at col. 4, lines 52-56,

the "...when the value defining the similarity...," is taught by Broder at col. 7, lines 35-37 and col. 4, lines 52-56,

and the "...is greater than a predetermined threshold...," is taught by Broder at col. 8, lines 23-27.

37. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broder and Hatakeyama as applied to claim 22 above, and further in view of Caid and Kisor.

As per claim 24, the "...generating a vector corresponding to the first and second objects...," is taught by Broder at col. 2, lines 45-47 and col. 4, lines 52-56,

but the "...each coordinate of the vector being associated with a corresponding weight...,"

the "...multiplying the weight associated with each coordinate in the vector...,"

the "...by a corresponding hashing vector to generate a product vector...,"

the "...summing the product vectors...,"

the "...and calculating a bit corresponding to each coordinate...,"

and the "...of the summed product vector...," are not taught by either Broder or Hatakeyama.

However, Caid teaches the use of coordinates of vectors with weights as follows:

"...By virtue of this formula, we can see that each w_i vector is expressed as a weighted sum of a fixed set of N vectors (the u_j)..." at col. 20, lines 17-20.

"...If we reexpress our w_i vectors in terms of the u_j basis vectors (i.e., taking the first coordinate of this new representation to be the u_1 component, the second to be the u_2 component, and so on) we get..." at col. 20, lines 40-44.

It would have been obvious to one of ordinary skill at the time of the invention to combine Caid with Broder and Hatakeyama to use coordinates of vectors with weights in order to represent multi-dimensional space with a commonly used representation to gain acceptance of the system. Broder, Hatakeyama, and Caid teach the use of related applications. They teach the use of computers, the use of documents, the use of words, the use of representations, the use of hashing, the use of values, and the measurement of similarity and Broder and Caid teach the use of networks, the use of vectors, and the use of objects. Broder provides sketches, vectors, and objects, Hatakeyama provides hashing functions and bitwise comparisons, and Caid provides coordinates of vectors with weights.

Caid does not teach the use of hashing vectors, the use of product vectors, and the summing of product vectors.

However, Kisor teaches the of hashing vectors, the use of product vectors, and the summing of product vectors as follows:

"...Study of the histographic distribution of the sums for the pixel elements of the different signal vectors suggested the foregoing hashing functions..." at col. 9, lines 49-51.

It would have been obvious to one of ordinary skill at the time of the invention to combine Kisor with Broder, Hatakeyama, and Caid to sum vectors in order to use a standard mathematical method of establishing relationships between vectors to gain acceptance of the system. Broder, Hatakeyama, Caid, Kisor teach the use of related applications. They teach the use of computers, the use of representations, the use of hashing, and the use of values, and Broder, Caid, and Kisor teach the use of networks and the use of vectors. Broder provides sketches, vectors, and objects, Hatakeyama provides hashing functions and bitwise comparisons, Caid provides coordinates of vectors with weights, and Kisor provides summing of hashing vectors to provide product vectors.

38. As per claim 25, the "...concatenating the generated bits...," is taught by Hatakeyama at col. 37, lines 19-22.

39. As per independent claim 26, the "...at least one processor...," is taught by Broder in Figure 1,

the "...a database comprising a plurality of documents...," is taught by Hatakeyama at col.45, lines 54-62,

the "...and a memory operatively coupled to the processor...," is taught by Broder in Figure 1,

the "...memory storing program instructions that when executed by the processor...," is taught by Broder in Figure 1,

the "...cause the processor to remove similar objects...," is taught by Broder at col. 10, lines 33-35 and col. 4, lines 52-56,

the "...from the database...," is taught by Hatakeyama at col.45, lines 54-62,

the "...by comparing similarity sketches of pairs of objects...," is taught by Broder at col. 2, lines 45-47 and col. 4, lines 52-56,

the "...in the database...," is taught by Hatakeyama at col.45, lines 54-62,

the "...and removing one of the objects of the pair...," is taught by Broder at col. 10, lines 33-35 and col. 4, lines 52-56,

the "...when the comparison indicates that the pair of objects...," is taught by Broder at col. 10, lines 48-49 and col. 4, lines 52-56,

the "...are more similar than a threshold level of similarity...," is taught by Broder at col. 8, lines 23-27

the "...processor generating the similarity sketches for each of the pair of objects...," is taught by Broder at col. 2, lines 46-47 and col. 4, lines 52-56,

the "...based on application of a hashing function...," is taught by Hatakeyama at col. 21, lines 39-42,

and the "...to vector representations of the objects...," is taught by Broder at col. 2, lines 53-55, col. 3, lines 1-4, and col. 4, lines 52-56.

40. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhuri et al. (U.S. Patent No. 5,806,061), Dasgupta (U.S. Patent No. 5,612,865),

Caid et al. (U.S. Patent No. 5,794,178), and Hatakeyama et al. (U.S. Patent No. 5,469,354).

41. Chaudhuri renders obvious independent claim 29 by the following:

"...generating an object vector corresponding to the object..." at col. 20, lines 15-17, col. 8, lines 51-53, and col. 1, lines 60-62.

"...of the object vector..." at col. 1, lines 60-62 and col. 8, lines 51-53.

Chaudhuir does not teach the use of hashing vectors with coördinates, the use of summed vectors, the use of compact representations, and the concatenation of bits.

42. However, Dasgupta teaches the use of hashing vectors with coordinates as follows:

"...generating a hashing vector corresponding to each coordinate..." at col. 10, lines 50-53.

"...corresponding to each coordinate..." at col. 10, lines 50-53.

It would have been obvious to one of ordinary skill at the time of the invention to combine Dasgupta with Chaudhuri to use hashing vectors in order to organize the vectors into groups related to properties to these groups. Chaudhuri and Dasgupta teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations. Chaudhuri provides sets of features corresponding to objects and Dasgupta provides the hashing vectors.

Dasgupta does not teach the use of summed vectors, the use of compact representations, and the concatenation of bits.

43. However, Caid teaches the use of summed vectors and compact representations as follows:

"...summing the hashing vectors to obtain a summed vector..." at col. 36, lines 27-31 and col. 12, lines 26-28.

"...of the summed product vector..." at col. 36, lines 27-31 and col. 12, lines 26-28.

"...and generating a compact representation of the object..." at col. 14, line 23 and col. 14, lines 40-43.

It would have been obvious to one of ordinary skill at the time of the invention to combine Caid with Chaudhuri and Dasgupta to use summed product vectors and compact representations in order to determine the characteristics that are most representative of the objects and to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, and Caid teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, the use of vectors, the use of objects, and the use of representations, Chaudhuri and Caid teach the use of attributes, the use of documents, the use of words, the use of values, and the use of features, and Dasgupta and Caid teach the use of networks and the use of coordinates. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, and Caid provides summed product vectors and compact representations.

Caid does not teach the concatenation of bits.

44. However, Hatakeyama teaches the concatenation of bits as follows:

"...calculating at least one bit..." at col. 37, lines 19-22.

"...by concatenating the calculated bits..." at col. 37, lines 19-22.

It would have been obvious to one of ordinary skill at the time of the invention to combine Hatakeyama with Chaudhuri, Dasgupta, and Caid to concatenate calculated bits in order to reduce the size of representations of objects and to reduce the amount of memory required by the representations of these objects. Chaudhuri, Dasgupta, Caid, and Hatakeyama teach the use of related applications. They teach the use of computers, the use of databases, the use of hashing, and the use of representations and Chaudhuri, Caid, and Hatakeyama teach the use of documents, the use of words, and the use of values. Chaudhuri provides sets of features corresponding to objects, Dasgupta provides the hashing vectors, Caid provides summed product vectors and compact representations, and Hatakeyama provides concatenation of calculated bits.

Conclusion

45. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harold E. Dodds, Jr. whose telephone number is (571)-272-4110. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on (571)-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Harold E. Dodds, Jr.
Patent Examiner
February 4, 2005

ROBINSON
EXAMINER